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ABSTRACT

This preapprenticeship preparation curriculum consists of 13 learning modules. Covered in the modules are the following: the nature and scope of apprenticeships, a pretest to assess students' mathematical skills, the General Aptitude Test Battery, interviews for an apprenticeship program, whole numbers, common fractions, decimal fractions, measurement, percentages and averages, applied algebra, applied geometry, applied trigonometry, and organization of a panel discussion involving program sponsors and union officials. Each module contains some or all of the following: an instructor's guide, one or more information sheets, and one or more student competency sheets. Included on the competency sheets are a competency statement, references to one or more suggested texts, and evaluation criteria. (MN)

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PRE-APPRENTICE PREPARATION

CURRICULUM

BVAE-76-AV-82-E-2

A pilot project prepared by Long-Moynahan Consultants
for Kanawha County Schools,
the West Virginia State Department; Bureau of
Vocational, Technical and Adult Education

April, 1982

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INSTRUCTOR'S GUIDE
MODULE 01
INTRODUCTION TO APPRENTICESHIPS

The method of presentation is left to the discretion of the instructor. It is recommended that the instructor lecture while the students follow the information sheet. The information sheets are written on a low reading level which enables individualized instruction. The lecture should cover the following information.

1. The history of apprenticeship programs.
2. The advantages of apprenticeship programs to employers and apprentices.
3. The apprenticeship standards.
4. The application process for acceptance into an apprenticeship program.
5. Equal opportunities in apprenticeship programs.

The evaluation consists of a pre and post check list. The students will indicate their knowledge of the subjects listed below before the lecture. After the lecture, the students will check any areas in which they feel they need more information. The instructor should then attempt to supply the student with any requested information.

STUDENT COMPETENCY SHEET

MODULE 01: Introduction To Apprenticeships

COMPETENCY STATEMENT 01: Identify the Concepts Which Form the Basis of Apprenticeship Programs

LEARNING ACTIVITIES:

1. Read the Pre and Post Check List given to you by your instructor and check each item you feel you already know.

2. Attend a lecture by your instructor on the topics listed below:

   A. The history of apprenticeship programs.

   B. The advantages of apprenticeship programs to employers and apprentices.

   C. The Apprenticeship Standards.

   D. The application process for acceptance into an apprenticeship program.

   E. Equal opportunities in apprenticeship programs.

3. Prepare a rough draft of your resume. Ask your instructor to review your work.

4. Make a list of any questions you may have on the above topics. Be prepared to talk about them during a class discussion.

EVALUATION:

Mark each item on the Pre and Post Check List that you would like to have more information on.

PRE AND POST CHECK LIST

Read the list below. If you know a lot of information about the topic, put a checkmark beside the number.

_____1. How apprenticeships evolved to what they are today.

_____2. Why employers feel apprentices are valuable.

_____3. Why people want to enter apprenticeships.

_____4. Age requirements for apprentices.

_____5. Related instruction required for apprentices.

_____6. Wages for apprentices.

_____7. How to apply and be accepted into an apprenticeship.

_____8. Discrimination in apprenticeships.

MODULE 01: INFORMATION SHEET

I. History of Apprenticeship

When we hear the word "apprenticeship" most of us think back hundreds of years to the days when a son would follow in his father's footsteps to learn his trade.

We also think of "indentured servants", as young men who would trade their labor for room, board, and training in a craft.

We have come a long way -- apprenticeships are now open to women, minorities and handicapped workers. Standards are kept and training methods are better. How did we get to where we are today?

When machines started taking over in the early part of the 19th century, employers began paying wages to workers instead of room and board. They paid workers on a scale that went higher as the workers learned more about the trade.

The first apprenticeship law, passed in 1911, made all apprentices attend a class for five (5) hours a week.

After World War I, industry was booming. The U.S. cut back on immigration, so there were not as many skilled workers coming into the country. Trained workers were needed. The government began "pushing" apprenticeships. This was in 1937.

The Bureau of Apprenticeship and Training worked then and now with employers, unions, schools and state government to help apprenticeships operate.

Today there are about four hundred twenty-five (425) apprenticeable occupations -- most of them in construction, manufacturing, transporation and service industries.

During the 1960's-1970's, laws were passed which kept people from not hiring you because of:

1. your sex
2. the color of your skin
3. where you are from
4. your religion

Another law was passed to require apprenticeship sponsors to recruit and hire women for training.

It is easy to see that apprenticeships have really been on the move over the last two hundred years.

II. The Advantage of Apprenticeships

Have you asked yourself -- why go to all trouble of an apprenticeship? Why not get a job and work yourself up the ladder? Why do employers want apprentices? Why don't they just hire people already trained? Here are some answers to those questions.

- Apprenticeships teach the workers everything about the trade. When they finish they can work with anybody in their shop or company. They know how the company works from the top to the bottom.
- They can go and work anywhere they are needed and be treated as a skilled worker.
- People who are apprentices are more educated, work better and have better chances for promotion than other craft workers.

. Studies show apprentices are safer workers.

. Apprentices have fewer and shorter periods of unemployment.

III. Apprenticeship Standards

If an apprenticeship program is to be approved by the Bureau of Apprenticeship and Training (BAT) it must meet these standards.

1. You can't be younger than 16 years old. Most apprenticeships require you to be 18 years old if it is considered a hazardous occupation. Some have a top age-say 24 or 26. This is now being tested as age discrimination and may be illegal in the future. This is important due to the fact if you apply when you are 24- you may have a long wait due to low demand. You may be "too old" before you get the chance to start. However, you can subtract the number of years you spent in military service from your age.

2. You are given a fair chance to apply. It is against the law to discriminate against you because of your color, origin, sex or religion.

3. There is a schedule of work available. You receive training and experience on the job.

4. There is instruction available. Usually you must attend 144 hours of school a year. You attend classes at the company, a local school or by correspondence (mail).

5. You make more money as you gain experience. When you start as an apprentice, it takes you 2 hours to do a certain job. The skilled worker only takes 1 hour. In other words, it takes you twice as long to do the same task. This is why your pay is 1/2 or 50% of the skilled worker's. If after one year, it takes you 1-1/2 hours to do a job that a skilled worker can do in an hour, then your wage rate would be 55 percent of the journey worker's pay. This goes on until you make about 90 or 95 percent of the journey worker's pay.

6. There is proper supervision of on-the-job training with proper training facilities available. You will be watched closely to make sure you do your job well and learn the correct ways of completing tasks. Your "teachers" will be skilled and interested in what you are doing. They will watch you, question you, and show you each new step to make sure you are learning.

7. There are evaluations in performance and related instruction and records are kept.

8. Employees and employers cooperate with each other to make sure the apprenticeship runs smoothly.

9. There is recognition for successful completions. You will be able to go anywhere in the country and be recognized as a skilled journey worker. You will be awarded a journey worker's certificate.

10. There is no discrimination in all phases of the apprenticeship.

IV. Application Processes for Acceptance into an Apprenticeship

The first step to take if you are going to apply for an apprenticeship is to get your records together. Have these ready before you do anything else! Here are some you may need:

1. Transcripts (list of courses completed and grades) (high school, vocation school, trade, technical or college courses).
2. High school diploma or GED certificate.
3. Official copy of birth certificate.
4. Letters of recommendation.
5. Military discharge papers.

The next step is to find out when applications are being accepted. Your state employment services will receive a notice 30 days before the first day applications will be accepted.

Most applications are accepted for 30, 60 or 90 days. You must file all of your papers by this time.

If you meet the minimum qualifications, you will be notified (most often by mail) of the date, time and place of the test.

A sample application form is on the next page. The types of tests will be discussed in another section of the class.

ESD-101
(R. 4/81)

APPLICATION FOR EMPLOYMENT WITH _____
(Employer)

Name in Full _____ Social Security No. _____
(Last) (First) (Middle)

Position Applied For _____

Home Address _____ Phone No. _____

Are You a Citizen of the U. S.? Yes ____ No ____

If not a citizen, do you have proof of right to work or for permanent residence in the U. S.?

Yes ____ No ____

Are you under 18? Yes ____ No ____

Are you over 69? Yes ____ No ____

EDUCATION

Circle highest grade completed 0 1 2 3 4 5 6 7 8 9 10 11 12 Above

School	Name and Address	Degree or Certificate
High School		
College		
Business or Vocational Schools		
Additional Training		

PROFESSIONAL AND CHARACTER REFERENCES (other than relatives)

Name	Address

WORK HISTORY: Describe Your Longest and Most Important Jobs - Including Military Service - Begin With Most Recent

Name of Employer	Job Title - Responsibilities - Tasks Performed Machines Operated - Tools Used
Address	
Type of Business	
From To Wage	
Reason for Leaving	
Name of Employer	Job Title - Responsibilities - Tasks Performed Machines Operated - Tools Used
Address	
Type of Business	
From To Wage	
Reason for Leaving	
Name of Employer	Job Title - Responsibilities - Tasks Performed Machines Operated - Tools Used
Address	
Type of Business	
From To Wage	
Reason for Leaving	

Summary of Other Work

Have you ever worked for this company under a different name? _____

If "yes", explain below:

I authorize investigation of all statements contained in this application.

Date _____

_____
Applicant's Signature

Before you fill out an application it would help you if you prepared a list of all your education and work experience. This is called a resume. If you have the resume in front of you as you fill out the application, you will not be as likely to leave out some valuable information. Many applicants have not been called for an interview because their applications were not very impressive.

Take some time and think about all of the areas listed below. Write down any information you know about yourself no matter how unimportant it seems to you. It will be a handy guide when you are filling out any kind of application.

I. Education
   A. High school:
      1. Name and address
      2. Year graduated
      3. Grade average
      4. Special classes
      5. Special activities

   B. College
      (same as above)

   C. Work Related Training
      Describe any classes you took at work which taught you any new skills or upgraded any other skills.

II. Employment
   For each job complete the following:
   1. Company name
   2. Address
   3. Dates of employment
   4. Type of business
   5. Your title
   6. Describe what you did.
   7. What were your most significant accomplishments.
   8. Why did you leave?
   9. What new skills did you learn on the job?

V. EQUAL OPPORTUNITY IN APPRENTICESHIPS

As you have been told, it is against the law to discriminate against someone because of their race, creed, or color. But, as in all aspects of life, discrimination does occur and you need to be aware of it.

You will not be promised an apprenticeship, just because you take this class. If you pass your test and go for your interview, your acceptance is not a sure thing.

The employer weighs his/her decision on:

1) Your school grades.
2) Your test scores.
3) Your work experience.
4) Your interview.

In the past, a relative in the trade helped applicants to be accepted. The employers today say this is not true any longer. Even so, a skilled worker in the family will know about openings in the trade. This would be an advantage to someone over an applicant who knew no one.

Discrimination will always exist as long as people make choices. However, just because you do not get accepted, it does not mean you were discriminated against.

About 60,000 openings occur each year and there are over 200,000 people who want to get in. For you to be selected into a program is against the odds (30% chance of getting in). The number of openings depend on:

1) Economic conditions.

2) Labor union activities.

3) Willingness of employers to train skilled craft workers

4) New technology

If you consider all these factors and feel like quitting -- Don't. You have a chance. Employers need a pool of skilled workers to draw from. You have many ambitions and lots of determination, or you wouldn't be reading this right now. Those are the very qualities that will make a good apprentice. Just go into the process with your eyes open and accept things as they really exist.

INSTRUCTOR'S GUIDE
MODULE 02
PRETEST

Students will be given a pretest for an assessment of their mathematical skills. It is suggested that they select one of the Delmar texts listed below for the examination.

PRACTICAL PROBLEMS IN MATHMATICS FOR:

Automotive Technicians
Carpenters
Electricians
Heating and Cooling Technicians
Machinists
Masons
Mechanical Drafting
Printers
Sheet Metal Technicians
Welders

The Review tests are in the back of the book and are numbered A and B. It is suggested that one of the tests be used for the pretest and the other for individual competency evaluations.

After the students have completed the examination, the tests should be scored. On each problem, the number of the corresponding unit is listed. Complete a Student Evaluation Form for each student which will list the competencies each student should complete.

The instructor will review the student's prescribed study programs with the student on a one to one basis and the student may add any competencies in which s/he feels they need additional instruction.

PREAPPRENTICESHIP
STUDENT EVALUATION FORM

Students Name _____

The instructor will mark with an "X" any competencies you should complete upon your pretest results.

You should place a "✓" beside any competencies you feel you would like to complete in addition to the instructor's recommendation.

_____ Add whole numbers
_____ Subtract whole numbers
_____ Multiply whole numbers
_____ Divide whole numbers
_____ Recognize fractional divisions in a steel tape
_____ Add common fractions
_____ Subtract common fractions
_____ Multiply common fractions
_____ Divide common fractions
_____ Compute fraction equivalents of decimals
_____ Add decimal fractions
_____ Subtract decimal fractions
_____ Multiply decimal fractions
_____ Divide decimal fractions
_____ Convert units of measurements
_____ Measure angles
_____ Compute English - metric equivalents

_____ Compute percentages

_____ Compute averages

_____ Find ratios and proportions

_____ Using equations to solve problems

_____ Raise or lower numbers to the indicated power

_____ Compute square roots

_____ Compute areas of squares and rectangles

_____ Compute the areas of triangles

_____ Compute the areas of circles

_____ Compute volumes of rectangular solids

_____ Compute volume of cylinders

_____ Apply the basic principles of right triangles to solve unknown values

_____ Use the Pythagorean Theorem to find the sides of a right triangle

_____ Use Sine and Cosine Laws to solve for unknown values in obilique triangles

SPECIALIZED AREAS:

You may want to explore some of the areas in the Delmar text books which will instruct you in specialized areas of math which pertain to specific skill areas -- Review these areas in the text book with your instructor.

INSTRUCTOR'S GUIDE
MODULE 03
APTITUDE TESTING

Although it is not feasible to teach aptitudes, it is beneficial to expose students to some of the methods used to test aptitudes.

The instructor can lecture on the information contained in Information Sheet A; or it can be used for individualized study.

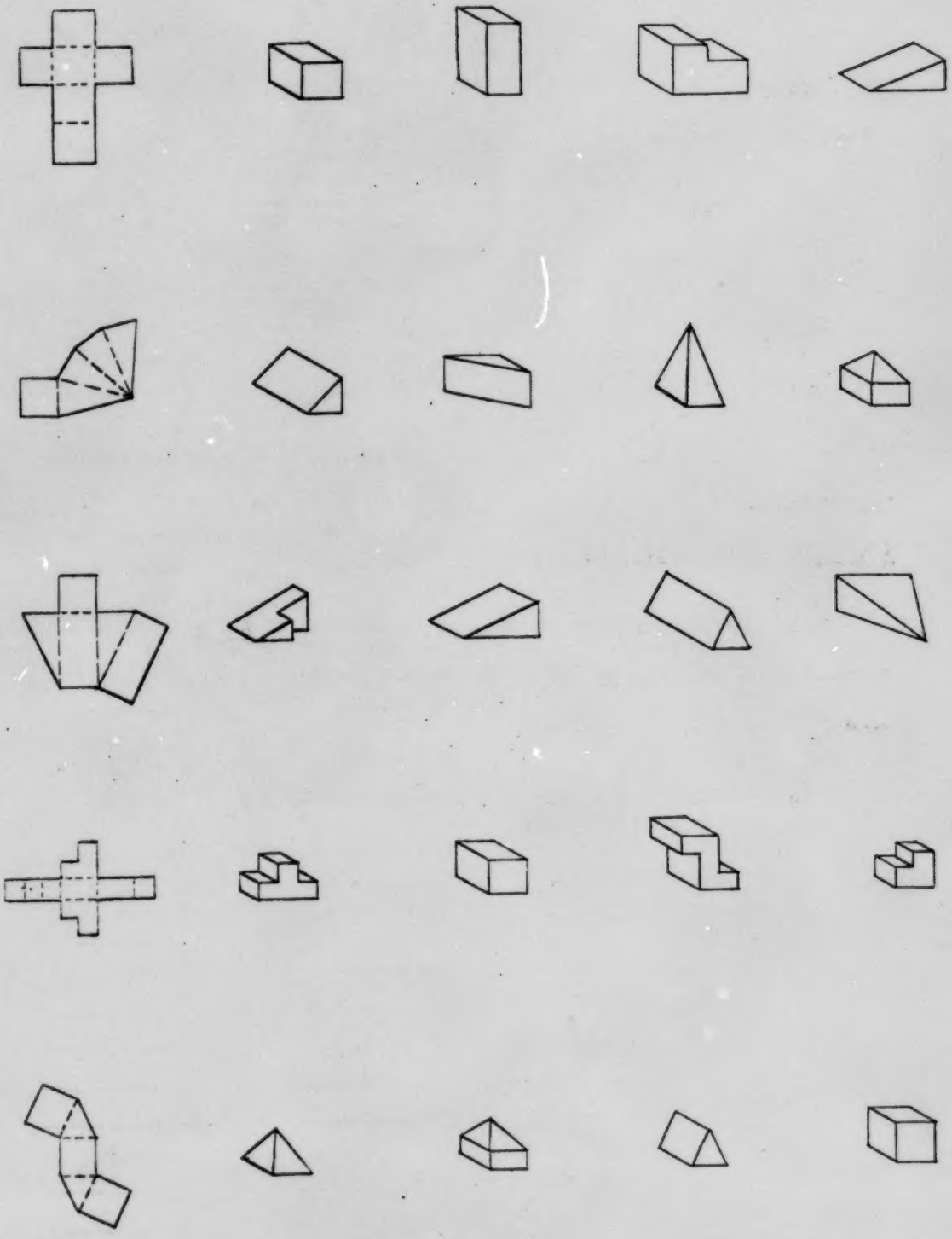
The instructor should lecture on each section of Worksheet B before the students attempt to complete the exercises.

Prior to the class session, the instructor should make arrangements for the counselor of the facility to lecture and demonstrate how the General Aptitude Test Battery is administered.

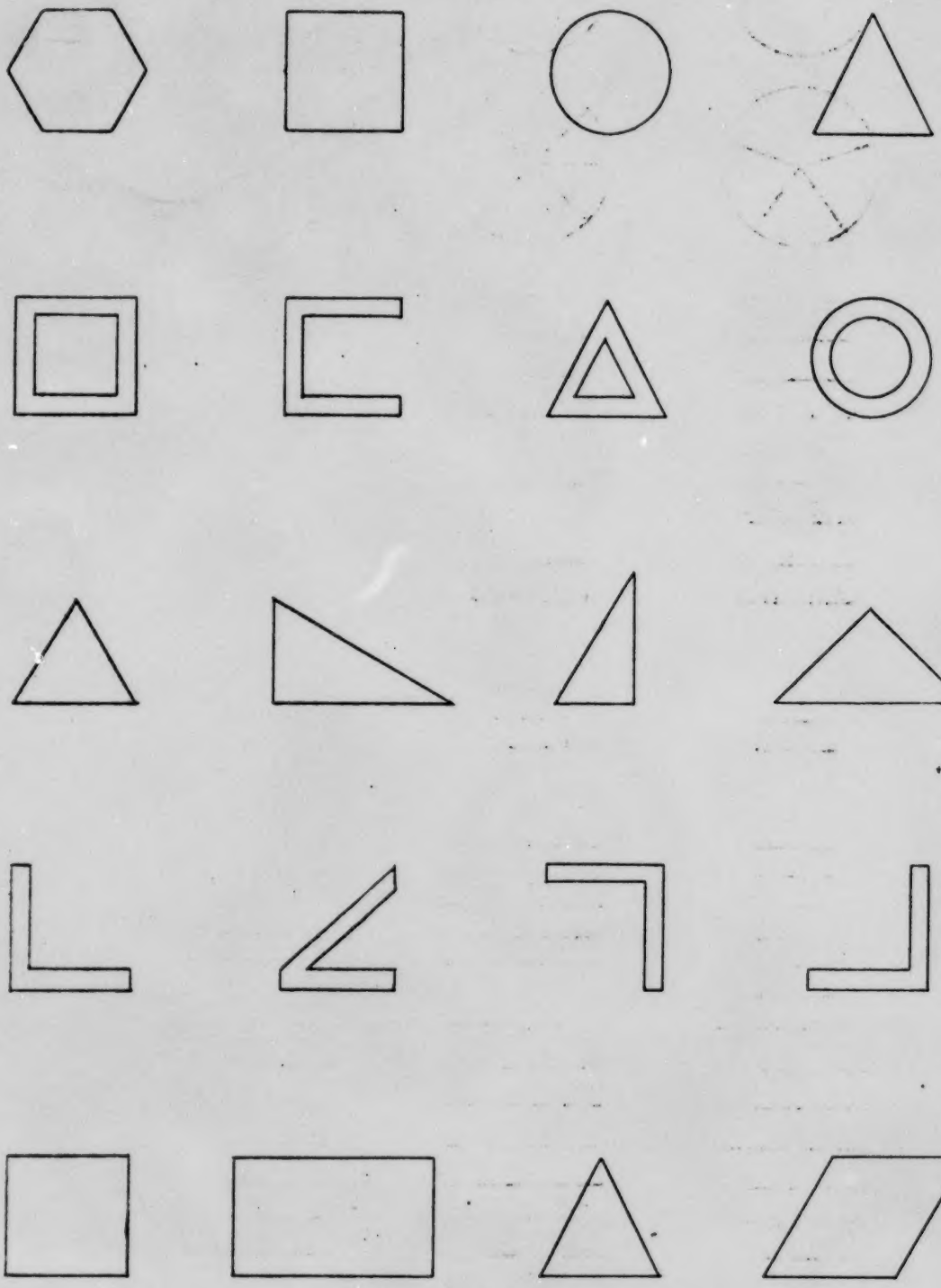
Encourage students to write down any questions they may have regarding testing methods used by specific trades. These will be used during the panel discussion in Module 13.

The Evaluation consists of a discussion with the class to assess the understanding of the various test methods used to test aptitudes.

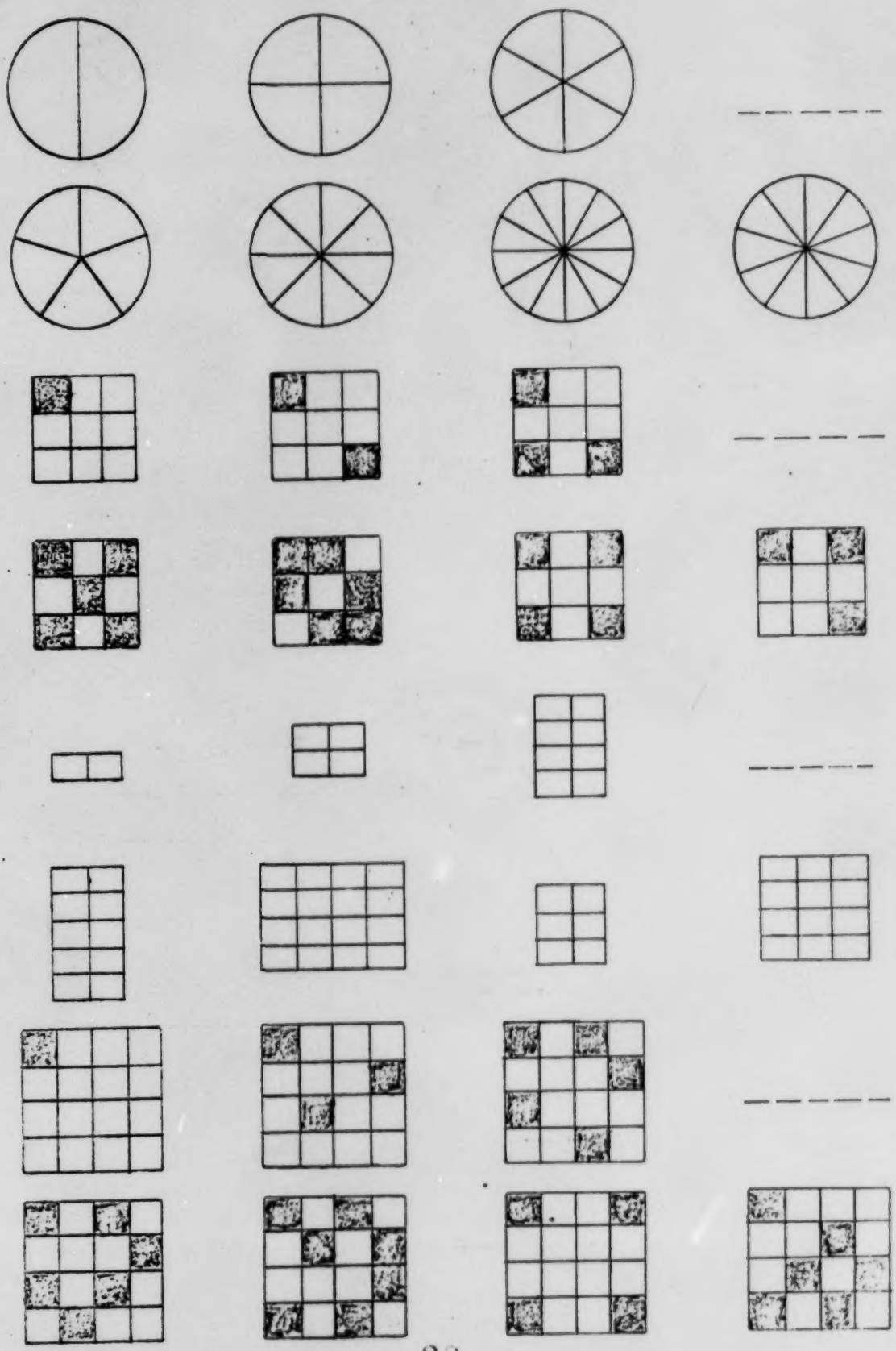
ANSWERS



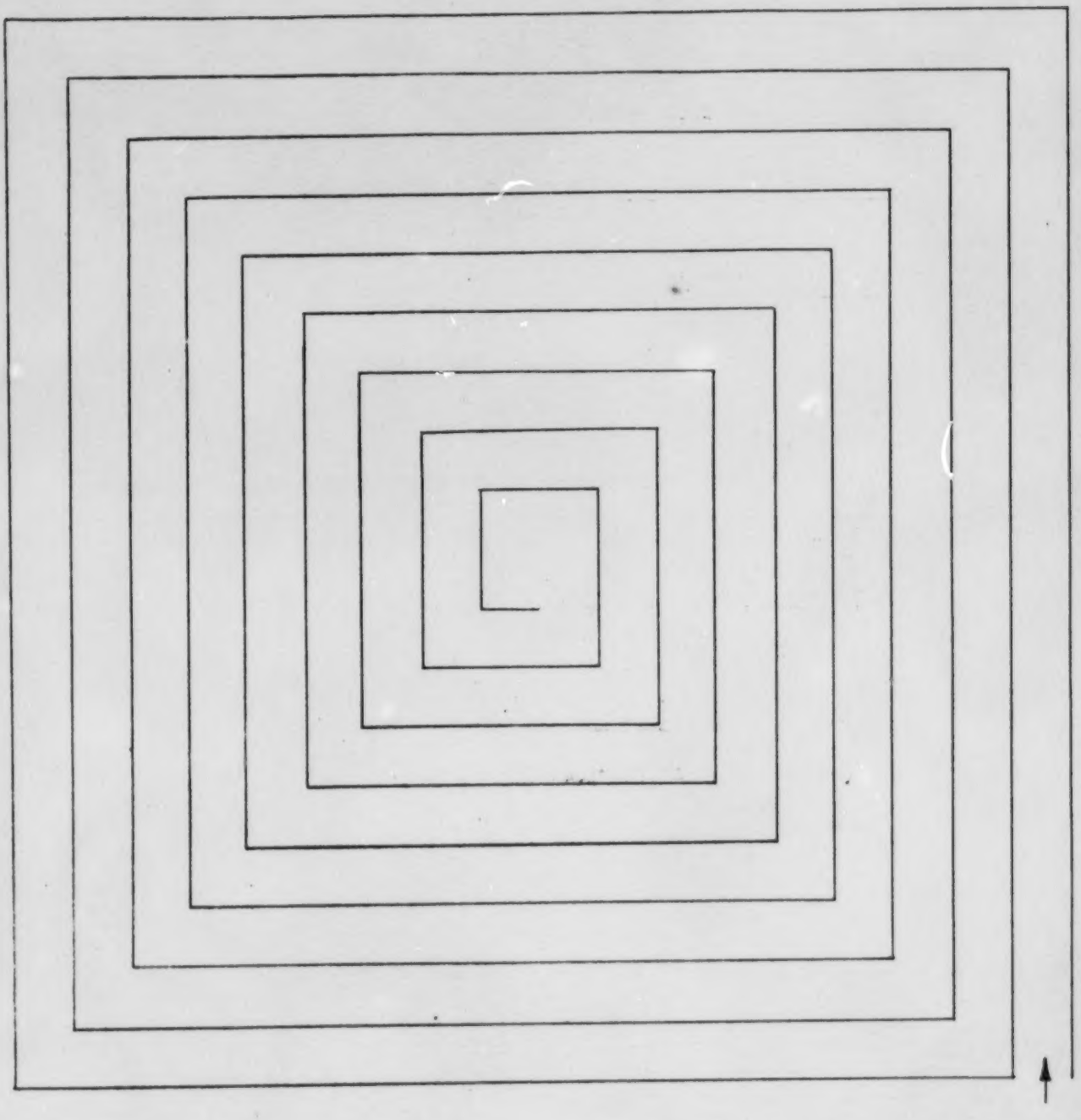
ANSWERS



ANSWERS



ANSWERS



STUDENT COMPETENCY SHEET

MODULE 03: Aptitude Testing

COMPETENCY STATEMENT 01: Recognize Test Instruments Used to Measure Aptitudes

LEARNING ACTIVITIES:

1. Read Information Sheet A. Be prepared to discuss the information with the other students in the class.

2. Attend a lecture/demonstration by your counselor on the General Aptitude Test Battery.

3. Complete Worksheet B as your instructor explains how to complete each section.

4. Write down any questions you may have regarding aptitude tests to be asked of union representatives during a panel discussion later in the course.

EVALUATION:

Given examples of aptitude testing instruments, you will explain orally to your instructor how to complete each one.

INFORMATION SHEET A
APTITUDE TEST

Have you wondered, "What is an aptitude test?" An aptitude test measures your ability to perform a skill, or to learn to do a skill in the future.

If there is one true fact about aptitude tests, it is this: You can't study for them. It is just like an eye test: You either have it or you don't.

However, that does not mean you cannot prepare yourself for the test. Often, if you know what to expect, you can approach the test relaxed. You may score higher relaxed, than if you were a nervous wreck and were thrown into shock when you first saw the questions.

This module will attempt to relax you by exposing you to some of the general types of questions you may find on an aptitude test.

Many apprenticeship programs require applicants to have certain aptitudes. For example, the applicant may be required to pass a Specific Aptitude Test Battery (SATB) test administered by the State Job Service. SATB's test two or more of the following nine general aptitudes: general learning ability (cognitive functioning), verbal aptitude, numerical aptitude, spatial aptitude, form perception (the ability to perceive small detail in an object), clerical perception (the ability to distinguish pertinent detail), motor coordination, finger dexterity, and manual dexterity.

Each battery tests different combinations of these nine general aptitudes because each occupation requires different specific abilities. For example, the SATB for a machine attendant measures only an applicant's finger dexterity, while the one for a medical technician tests four aptitudes -- general learning ability, verbal aptitude, form perception, and clerical perception.

The length of an SATB depends on the aptitudes it measures. Some questions are written, and some tests use peg boards and other apparatus for measuring manual aptitudes such as finger dexterity (see sample questions). "Low," "medium," and "high" scores are given. Some programs will accept only a "high" rating, other a "medium" rating.

All nine general aptitudes are tested by the General Aptitude Test Battery. It is frequently used by counselors to help people interested in apprenticeship programs to decide which trade to pursue.

Some companies have devised their own tests, which they administer themselves. They report the scores to whoever is handling the apprenticeship application. Such tests often measure an applicant's familiarity with the tools and the terms of the trade.

People who get nervous or who have other problems taking tests, can get a booklet published by the Employment Service called "Doing Your Best on Aptitude Tests." Also available are special versions of the tests for people who speak Spanish. (Occupational Outlook Handbook Summer 1978)

WORKSHEET B

I. General and Verbal

Most aptitude tests contain sections which test your reasoning skills and general understanding of facts. The tests look like this:

1. Which word means the opposite of happy?

   a. joyful b. depressed c. satisfied d. rude

Seem easy? Usually they start off easy and get harder. The directions of the question can get harder as well as your choice of answers.

2. Which words have the opposite meaning?

   a. old b. ancient c. cold d. young

The questions can be mathematical reading problems such as:

3. A person works 8 hours a day 5 days a week. He earns 56 dollars a week. How much does he earn an hour? A day?

You might have to check spelling or punctuation as in the following.

4. Which word(s) is(are) spelled incorrectly?

   a. professional
   b. apprenteciships
   c. apprenticships
   d. apprentices

A good rule of thumb is to make sure you read the questions carefully. Watch out for words such as "opposite" or "true" and "false."

If you have poor reading skills, you could have problems with this section of the test.

II. Many of the aptitude tests contain sections which require you to look at a flat drawing and try to see it "put together". They may give you several shapes and ask you which two are alike, or which shape is different from the others. You cannot study for this type of test but you can be exposed to how the questions will appear on the test.

Study the example below:

Below is a drawing of a flat piece of metal. Which of the four objects below can be made from the piece of metal?

A.

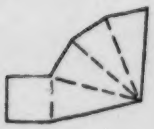
B.

C.

D.

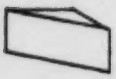
The answer is A.

1.



A.

B.

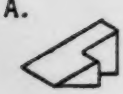


C.

D.

2.

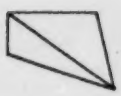
A.



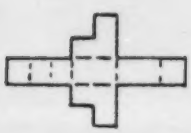
B.

C.

D.



3.



A.

B.

C.

D.

4.

A.

B.

C.

D.

III. Often aptitude tests will ask you to find the item that "doesn't belong." For the shapes on the next page find the shape that is different than the others.

Below is an example.

A. B. C. D.

The answer is C. The circle does not belong because it does not have any "sides."

A. B. C. D.

1.

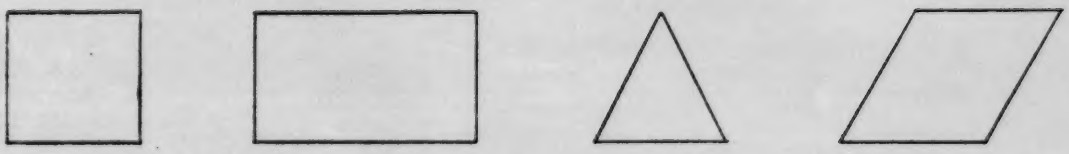
A. B. C. D.

2.

A. B. C. D.

3.

A. B. C. D.

4. 

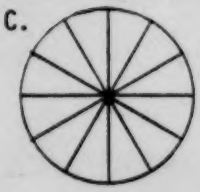
IV. On many aptitude tests you will see problems which use patterns. You have to figure out what the pattern is and then tell what comes next. Work the four problems on the next page after you study the example below.

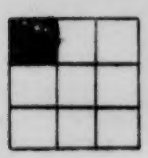
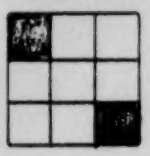
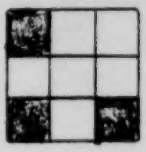
2 4 6 8 ___

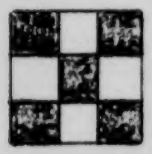
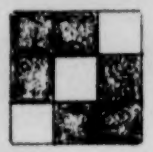
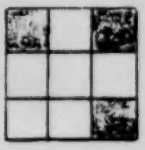
A. 7 B. 10 C. 9 D. 11

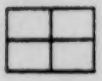
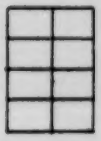
The answer is 10. The pattern is multiples of two.

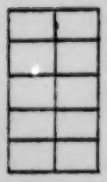
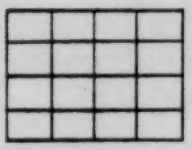
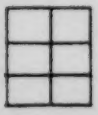
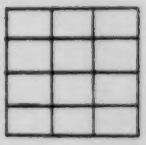
1. _____

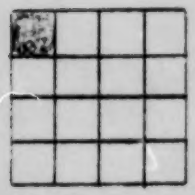
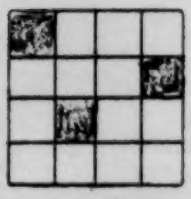
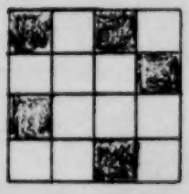
A. B. C.  D.

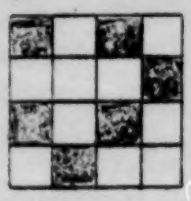
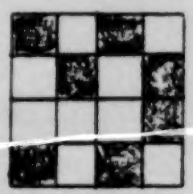
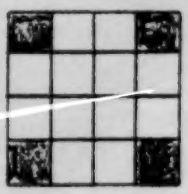
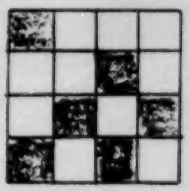
2.    _____

A.  B.  C. D. 

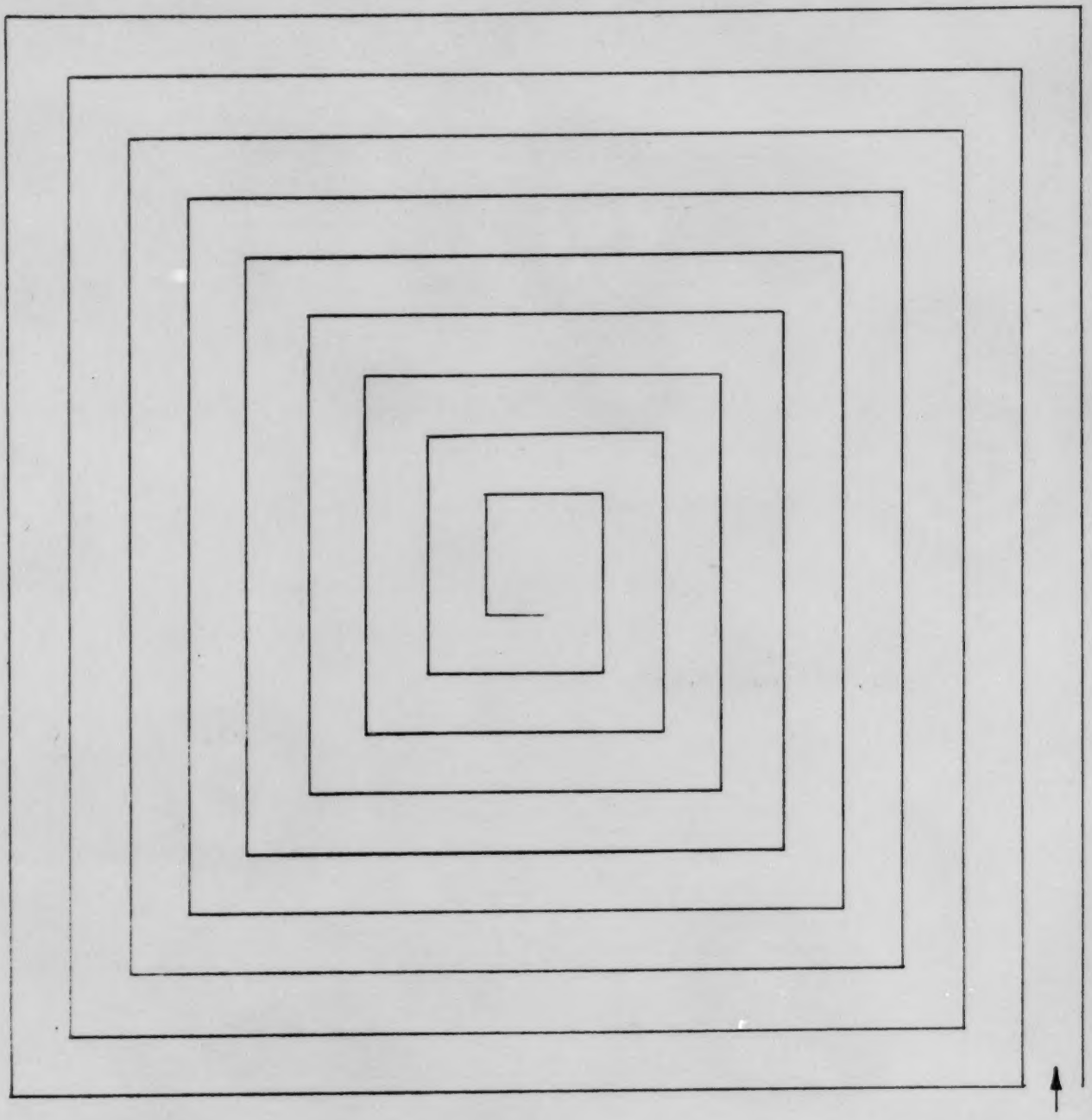
3.   _____

A.  B.  C.  D. 

4.    _____

A.  B.  C.  D. 

V. One method of testing coordination is to have the person see how fast they can trace inside two lines without touching the lines. The person is usually timed. Use the drawing on the next page and trace inside the lines of the square. Do not touch the edges. You have 15 seconds. See how far you can go into the square.



INSTRUCTOR'S GUIDE
MODULE 04
THE INTERVIEW

This module should begin wtih the instructor leading a class discussion on the contents of Information Sheet A.

The students will then score themselves on the Sample Evaluation Sheet. The instructor should review each student's self evaluation.

The next activities are role playing situations between the students. The instructor should discuss the difference between the self evaluations and the evaluations given by the student's peers.

For the Evaluation the instructor should have a discussion with each student to discuss the areas they could improve, and the strong points they should emphasize during the interview.

STUDENT COMPETENCY SHEET

MODULE 04: The Interview

COMPETENCY STATEMENT 01: Identify the Normal Procedure Followed During an Interview for an Apprenticeship Program

LEARNING ACTIVITIES:

1. Read Information Sheet A. "The Apprenticeship Interview." Be prepared to discuss it during a class discussion led by your instructor.

2. Use the "Sample Evaluation Sheet" and score yourself on each item. Discuss the results with your instructor.

3. Role play an interview with another student in the class. Interview them and complete the Sample Evaluation Sheet as if you were the sponsor or employer. After the interview, explain to the student how and why you rated them as you did.

4. Compare the self-evaluation you completed in Learning Activity 2 with the Evaluation you received during the role playing interview in Learning Activity 3. Be prepared to discuss the differences between the two during a class discussion.

EVALUATION:

You will discuss with your instructor your strong and weak points you will have going into your interview. You will discuss:

1. Areas you can improve upon before time for your interview.
2. How to emphasize your strong points during the interview.

INFORMATION SHEET A
"THE APPRENTICESHIP INTERVIEW"

The pressure is on. You have passed your examination and you received a letter in the mail, telling you the exact time and place of your interview. You will have one chance to get on the register. All kinds of questions run through your mind. What will they ask me? How will I answer them? A major event in my life is in someone else's hand.

Well, after all of these questions, who wouldn't be scared to death? Just relax and read on. The information in this section may help to ease some of your fears. It is the fear of the unknown that keeps most people's hair on end.

First, a review of the general interview tips:

1. Be on time.
2. Be courteous to the receptionist.
3. Do not chew gum or smoke or drink during the interview. (This is more for your own protection than anything else.) You may be nervous and you won't want to appear clumsy. Choking, spilling liquids or burning yourself will not help sell yourself.
4. Look the interviewer(s) straight in the eye. Eye to eye contact gives out a feeling of confidence.
5. Dress in comfortable, neat clothes. You don't have to wear a tuxedo-but a tie and coat, or "dress pants" or suit dress would be appropriate. Some people might argue that construction people would accept jeans or work clothes. However, remember you are there for an interview, not to report to work.
6. Answer all of the questions honestly. This is not the time to cover up any unpleasant facts about yourself.
7. Be prepared for the questions you will be asked. General questions, such as, "Why do you want to become an apprentice?"

seem to throw people. They know the answers, but they just can't get it out during an interview. Think of how you will answer these questions before you go in.

8. Write a thank you note to the receptionist and interviewer after the interview. They will remember you and it is nice that you recognize their efforts to find the right person for the opening.

Now for the specifics on the interview.

All applications are reviewed by the sponsor's personnel or representative office to make sure applicants have fulfilled the general requirements. If they have, the Joint Apprenticeship Committee or the administrative body representing the sponsor will interview each applicant individually.

At the interview, a group of about 4 people will ask questions about the applicant's physical health, interest in the trade, and attitude toward apprentice. Personal traits such as aggressiveness and sincerity also will be noted. Questions such as these may be asked: Do you like to work with your hands? What makes you think you'd be a good craftworker? Do you know that the work is hard? Interviewers want to know if applicants are qualified, but the oral examination also helps them to determine whether or not applicants would commit themselves to the work and whether or not they would be persistent enough to finish the program.

After the interview, the Committee rates the applicant numerically based on his or her qualification and on the interview (see sample evaluation sheets). This rating will determine the applicant's place on the waiting list, called a register, for apprenticeship openings. People who want to move up on a register may improve their ratings by increasing the level of their qualifications, such as by taking more related courses, or by requesting another

interview or application review by the Committee if applicants think they were unfairly treated initially.

Although there is no set of questions that interviewers must ask, records of interviewers are often kept, including brief summaries of specific factors uncovered, such as motivation, ambition, and willingness to accept direction. These records are required of registered programs and help the Committee members review their notes and explain ratings to applicants.

If, after 2 years, an applicant has not been referred for an apprenticeship opening, the applicant must reactivate his or her file by reapplying. Although the process of reapplication does not require another interview, applicants should try to improve their ratings by making a better impression at a second interview. (Occupational Outlook Handbook Summer 1978)

INSTRUCTOR'S GUIDE
MODULE: 5-12

The students will use the results of the pretest to begin work on the competencies they desire in the area of mathematics. They will work on an individualized basis with supervision and assistance from the instructor.

If the students score 100% in the problems completed in the Learning Activities, they can skip the Evaluation.

For the Evaluation, it is recommended that the instructor pull problems from the Achievement Review B at the end of each Delmar textbook.

The number of problems in the Evaluation is left up to the instructor.

If the student does not acquire 100% accuracy in the Evaluation, s/he should select another textbook and complete the problems applicable to the competency.

Sample Evaluation Sheet for an Interview

PART III. SUMMARY OF FACTORS (To be filled in by the Committee member during the interview.)

Education: Survey of high school and college courses beyond those directly applicable to the trade.

Poor background. Took minimum academic courses. Poor grades.	Fair background. Some academic electives. Grades below average.	Medium background. Average course electives with fair grades.	Good background. College prep or some college work.	Excellent background. Extra subjects, college or post-high school with good grades.

Remarks: _____

_____

Physical Factors: An assessment of physical ability to perform the requirements of the classification, lost time, health history, stamina and family health.

Unsatisfactory because:	Doubtful—Verification needed:	Satisfactory

Interest: Desire to be a craftsman, reasons for choosing this trade, knowledge of the trade, etc., interest in hobbies that would have a direct reflection on the trade.

Total lack of interest (just wants a job)	Little interest, past association shows very slight interest	Fair interest indicated by past associations and hobbies	Displays a real interest	Manifests strong desire to be craftsman

Remarks: _____

_____

Attitude: Towards hard work: (Has he or she ever done any?) Towards school work: (How was his or her attendance in school?) Towards authority: (Will he or she work under supervision?) Towards teamwork: (Has he or she ever belonged to any organized groups, extra-curricular activities and sports?) Towards responsibility: (Past employment, school activities and military records.)

Unacceptable	Poor	Fair	Good	Excellent

Remarks: _____

_____

Personal Traits: Appearance, aggressiveness, sincerity, dependability, character, and habits.

Unacceptable	Poor	Fair	Good	Excellent

Remarks: _____

_____

After careful consideration of all factors, my grade for this applicant is:

0	10	20	30	40	50	60	70	80	90	100

In appropriate box, write in exact numerical grade such as 67, 83, or 95.

_____ (Interviewer)

_____ (Date)

STUDENT COMPETENCY SHEET

MODULE 05: Whole Numbers

COMPETENCY STATEMENT 01: Add Whole Numbers

LEARNING ACTIVITIES:

1. Study Unit 1 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	1-2
Carpenters	1-5
Electricians	1-3
Heating and Cooling Technicians	1-4
Machinists	1-4
Masons	1-3
Mechanical Drafting	1-5
Printers	1-3
Sheet Metal Technicians	N/A
Welders	1-2

EVALUATION:

Given no more than 10 problems by your instructor, you will add the whole numbers with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 05: Whole Numbers

COMPETENCY STATEMENT 02: Subtract Whole Numbers

LEARNING ACTIVITIES:

1. Study Unit 2 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	3-4
Carpenters	6-9
Electricians	4-6
Heating and Cooling Technicians	5-7
Machinists	5-7
Masons	4-6
Mechanical Drafting	6-8
Printers	4-5
Sheet Metal Technicians	N/A
Welders	3-4

EVALUATION:

Given no more than 10 problems by your instructor, you will subtract the whole numbers with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 05: Whole Numbers

COMPETENCY STATEMENT 03: Multiply Whole Numbers

LEARNING ACTIVITIES:

1. Study Unit 3 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	5-6
Carpenters	10-13
Electricians	7-9
Heating and Cooling Technicians	8-9
Machinists	8-10
Masons	7
Mechanical Drafting	9-11
Printers	6
Sheet Metal Technicians	N/A
Welders	5

EVALUATION:

Given no more than 10 problems by your instructor, you will multiply the whole numbers with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 05: Whole Numbers

COMPETENCY STATEMENT 04: Divide Whole Numbers

LEARNING ACTIVITIES:

1. Study Unit 4 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	7-8
Carpenters	14-16
Electricians	10-12
Heating and Cooling Technicians	10-12
Machinists	11-13
Masons	8-9
Mechanical Drafting	12-14
Printers	7
Sheet Metal Technicians	N/A
Welders	6

EVALUATION:

Given no more than 10 problems by your instructor, you will divide the whole numbers with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 06: Common Fractions

COMPETENCY STATEMENT 01: Recognize Fractional Divisions in a Steel Tape

LEARNING ACTIVITIES:

1. Study Unit 6 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Attend a lecture by your instructor on the fractional divisions in a steel tape.

3. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	9-11
Carpenters	N/A
Electricians	N/A
Heating and Cooling Technicians	N/A
Machinists	N/A
Masons	10-12
Mechanical Drafting	N/A
Printers	11-12
Sheet Metal Technicians	9-10
Welders	7-19

EVALUATION:

Given no more than 10 problems by your instructor, you will recognize the fractional divisions of a steel tape with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 06: Common Fractions

COMPETENCY STATEMENT 02: Add Common Fractions

LEARNING ACTIVITIES:

1. Study Unit 7 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	12-15
Carpenters	17-22
Electricians	15-17
Heating and Cooling Technicians	16-20
Machinists	14-18
Masons	13-18
Mechanical Drafting	20-22
Printers	8-10
Sheet Metal Technicians	5
Welders	11-14

EVALUATION:

Given no more than 10 problems by your instructor, you will add the common fractions with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 06: Common Fractions

COMPETENCY STATEMENT 03: Subtract Common Fractions

LEARNING ACTIVITIES:

1. Study Unit 8 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	17-21
Carpenters	23-27
Electricians	18-20
Heating and Cooling Technicians	21-24
Machinists	19-22
Masons	19-22
Mechanical Drafting	23-25
Printers	13-14
Sheet Metal Technicians	11-12
Welders	15-19

EVALUATION:

Given no more than 10 problems by your instructor, you will subtract the common fractions with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 06: Common Fractions

COMPETENCY STATEMENT 04: Multiply Common Fractions

LEARNING ACTIVITIES:

1. Study Unit 9 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	22-24
Carpenters	28-31
Electricians	21-22
Heating and Cooling Technicians	25-27
Machinists	23-24
Masons	23-25
Mechanical Drafting	26-28
Printers	15-16
Sheet Metal Technicians	13
Welders	33-36

EVALUATION:

Given no more than 10 problems by your instructor, you will multiply the common fractions with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 06: Common Fractions

COMPETENCY STATEMENT 05: Divide Common Fractions

LEARNING ACTIVITIES:

1. Study Unit 10 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	25-27
Carpenters	32-34
Electricians	23-24
Heating and Cooling Technicians	28-30
Machinists	25-28
Masons	26-27
Mechanical Drafting	29-31
Printers	17-18
Sheet Metal Technicians	14
Welders	23-25

EVALUATION:

Given no more than 10 problems by your instructor, you will divide the common fractions with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 07: Decimal Fractions

COMPETENCY STATEMENT 01: Compute Fraction Equivalents of Decimals

LEARNING ACTIVITIES:

1. Study Unit 12 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	28
Carpenters	55-60
Electricians	38-39
Heating and Cooling Technicians	46-47
Machinists	N/A
Masons	36-37
Mechanical Drafting	52-53
Printers	N/A
Sheet Metal Technicians	16
Welders	42-45

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the fraction equivalents of decimals, or decimals into fractions with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 07: Decimal Fractions

COMPETENCY STATEMENT 02: Add Decimal Fractions

LEARNING ACTIVITIES:

1. Study Unit 13 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	12-16
Carpenters	17-22
Electricians	15-17
Heating and Cooling Technicians	36-38
Machinists	32-34
Masons	28-29
Mechanical Drafting	35-38
Printers	19-21
Sheet Metal Technicians	11-12
Welders	30-32

EVALUATION:

Given no more than 10 problems by your instructor, you will add the decimal fractions with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 07: Decimal Fractions

COMPETENCY STATEMENT 03: Subtract Decimal Fractions

LEARNING ACTIVITIES:

1. Study Unit 14 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	33-36
Carpenters	46-49
Electricians	18-20
Heating and Cooling Technicians	39-41
Machinists	35-37
Masons	30-31
Mechanical Drafting	39-41
Printers	22-24
Sheet Metal Technicians	11-12
Welders	30-32

EVALUATION:

Given no more than 10 problems by your instructor, you will subtract the decimal fractions with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 07: Decimal Fractions

COMPETENCY STATEMENT 04: Multiply Decimal Fractions

LEARNING ACTIVITIES:

1. Study Unit 15 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	22-24
Carpenters	50-52
Electricians	34-35
Heating and Cooling Technicians	42-43
Machinists	38-40
Masons	32-33
Mechanical Drafting	42-44
Printers	25
Sheet Metal Technicians	13
Welders	33-36

EVALUATION:

Given no more than 10 problems by your instructor, you will multiply the decimal fractions with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 07: Decimal Fractions

COMPETENCY STATEMENT 05: Divide Decimal Fractions

LEARNING ACTIVITIES:

1. Study Unit 16 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	53-54
Carpenters	53-54
Electricians	36-37
Heating and Cooling Technicians	44-45
Machinists	41-45
Masons	34-35
Mechanical Drafting	45-47
Printers	26-27
Sheet Metal Technicians	14
Welders	37-39

EVALUATION:

Given no more than 10 problems by your instructor, you will divide the decimal fractions with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 08: Measurement

COMPETENCY STATEMENT 01: Convert Units of Measurements

LEARNING ACTIVITIES:

1. Study Unit 19 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	61-62
Carpenters	73-79
Electricians	59-62
Heating and Cooling Technicians	63-68
Machinists	49-62
Masons	42-45
Mechanical Drafting	55-59
Printers	39-40
Sheet Metal Technicians	26-27
Welders	55-67

EVALUATION:

Given no more than 10 problems by your instructor, you will convert the different units of measurement into one unit with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 08: Measurement

COMPETENCY STATEMENT 02: Measure Angles

LEARNING ACTIVITIES:

1. Study Unit 20 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	65-68
Carpenters	N/A
Electricians	N/A
Heating and Cooling Technicians	76-78
Machinists	N/A
Masons	N/A
Mechanical Drafting	68-72
Printers	44-45
Sheet Metal Technicians	31-33
Welders	80-83

EVALUATION:

Given no more than 10 problems by your instructor, you will measure the angles with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 08: Measurement

COMPETENCY STATEMENT 03: Compute English - Metric Equivalents

LEARNING ACTIVITIES:

1. Study Unit 23 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	62
Carpenters	N/A
Electricians	N/A
Heating and Cooling Technicians	N/A
Machinists	N/A
Masons	N/A
Mechanical Drafting	64-67
Printers	41-44
Sheet Metal Technicians	138-139
Welders	68-73

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the English - Metric equivalents with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 09: Percentages and Averages

COMPETENCY STATEMENT 01: Compute Percentages

LEARNING ACTIVITIES:

1. Study Unit 25 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	50-53
Carpenters	61-64
Electricians	42-43
Heating and Cooling Technicians	51-52
Machinists	95-100
Masons	38-39
Mechanical Drafting	73-76
Printers	29-32
Sheet Metal Technicians	46-47
Welders	116-118

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the percentages with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 08: Measurement

COMPETENCY STATEMENT 03: Compute English - Metric Equivalents

LEARNING ACTIVITIES:

1. Study Unit 23 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	62
Carpenters	N/A
Electricians	N/A
Heating and Cooling Technicians	N/A
Machinists	N/A
Masons	N/A
Mechanical Drafting	64-67
Printers	41-44
Sheet Metal Technicians	138-139
Welders	68-73

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the English - Metric equivalents with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 09: Percentages and Averages

COMPETENCY STATEMENT 01: Compute Percentages

LEARNING ACTIVITIES:

1. Study Unit 25 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	50-53
Carpenters	61-64
Electricians	42-43
Heating and Cooling Technicians	51-52
Machinists	95-100
Masons	38-39
Mechanical Drafting	73-76
Printers	29-32
Sheet Metal Technicians	46-47
Welders	116-118

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the percentages with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 09: Percentages and Averages

COMPETENCY STATEMENT 02: Compute Averages

LEARNING ACTIVITIES:

1. Study Unit 27 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	N/A
Carpenters	N/A
Electricians	48-49
Heating and Cooling Technicians	N/A
Machinists	N/A
Masons	N/A
Mechanical Drafting	73-77
Printers	N/A
Sheet Metal Technicians	45
Welders	114-115

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the averages with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 10: Applied Algebra

COMPETENCY STATEMENT 01: Find Ratios and Proportions

LEARNING ACTIVITIES:

1. Study Units 53-54 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	74-85
Carpenters	100-104; 109-110
Electricians	77-80
Heating and Cooling Technicians	56-62
Machinists	137-144
Masons	N/A
Mechanical Drafting	91-93
Printers	N/A
Sheet Metal Technicians	43-44
Welders	N/A

EVALUATION:

Given no more than 10 problems by your instructor, you will find the ratios and proportions with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 10: Applied Algebra

COMPETENCY STATEMENT 02: Using Equations to Solve Problems

LEARNING ACTIVITIES:

1. Study Unit 43 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	N/A
Carpenters	N/A
Electricians	N/A
Heating and Cooling Technicians	N/A
Machinists	114-116
Masons	N/A
Mechanical Drafting	87-90
Printers	N/A
Sheet Metal Technicians	113-118
Welders	N/A

EVALUATION:

Given no more than 10 problems by your instructor, you will use equations to solve problems with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 10: Applied Algebra

COMPETENCY STATEMENT 03: Raise or Lower Numbers to the Indicated Power

LEARNING ACTIVITIES:

1. Study Unit 57 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	86
Carpenters	111-113
Electricians	52-53
Heating and Cooling Technicians	N/A
Machinists	150-152
Masons	86-88
Mechanical Drafting	94-96
Printers	N/A
Sheet Metal Technicians	N/A
Welders	N/A

EVALUATION:

Given no more than 10 problems by your instructor, you will raise or lower the numbers to the indicated power with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 10: Applied Algebra

COMPETENCY STATEMENT 04: Compute Square Roots

LEARNING ACTIVITIES:

1. Study Units 61-63 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	87
Carpenters	114-121
Electricians	54-56
Heating and Cooling Technicians	N/A
Machinists	153-155
Masons	89-90
Mechanical Drafting	94-96
Printers	N/A
Sheet Metal Technicians	119-120
Welders	N/A

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the square roots with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 11: Applied Geometry

COMPETENCY STATEMENT 01: Compute Areas of Squares and Rectangles

LEARNING ACTIVITIES:

1. Study Unit 20 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	69-71
Carpenters	122-123
Electricians	63-67
Heating and Cooling Technicians	83-87
Machinists	70-74
Masons	46-59
Mechanical Drafting	114-120 (see instructor)
Printers	46-47
Sheet Metal Technicians	40
Welders	84-86

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the area of the squares and rectangles with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 11: Applied Geometry

COMPETENCY STATEMENT 02: Compute the Areas of Triangles

LEARNING ACTIVITIES:

1. Study Unit 21 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	69-71
Carpenters	125-127
Electricians	63-67
Heating and Cooling Technicians	83-87
Machinists	75-77
Masons	56-58
Mechanical Drafting	114-121
Printers	44
Sheet Metal Technicians	34-35
Welders	87-90

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the areas of the triangles with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 11: Applied Geometry

COMPETENCY STATEMENT 03: Compute the Areas of Circles

LEARNING ACTIVITIES:

1. Study Unit 19 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	63-64
Carpenters	132-134
Electricians	63-67
Heating and Cooling Technicians	83-87
Machinists	78-80
Masons	59-62
Mechanical Drafting	121-126
Printers	44-45
Sheet Metal Technicians	70
Welders	90-92

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the areas of the circles with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 11: Applied Geometry

COMPETENCY STATEMENT 04: Compute Volumes of Rectangular Solids

LEARNING ACTIVITIES:

1. Study Unit 22 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	69-71
Carpenters	135-137
Electricians	68-71
Heating and Cooling Technicians	92-94
Machinists	84-86
Masons	68-75
Mechanical Drafting	N/A
Printers	46-47
Sheet Metal Technicians	75
Welders	93-96

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the volume of the rectangular solids with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 11: Applied Geometry

COMPETENCY STATEMENT 05: Compute Volume of Cylinders

LEARNING ACTIVITIES:

1. Study Unit 21 (D,E, & F) in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready, ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Automotive Technicians	69-71
Carpenters	138-140
Electricians	68-71
Heating and Cooling Technicians	95-97
Machinists	87-90
Masons	N/A
Mechanical Drafting	135-139
Printers	46-47
Sheet Metal Technicians	76
Welders	97-98

EVALUATION:

Given no more than 10 problems by your instructor, you will compute the volume of the cylinders with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 12: Applied Trigonometry

COMPETENCY STATEMENT 01: Apply the Basic Principles of Right Triangles to Solve Unknown Values

LEARNING ACTIVITIES:

1. Read Units 78, 79 and 80 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Choose one of the texts below and work the problems. You may want to work out of several of the textbooks. When you feel you are ready ask your instructor to review your work. If you score 100% you may skip the Evaluation and go on to the next competency statement.

TEXT	PAGE NUMBERS
PRACTICAL PROBLEMS IN MATHEMATICS FOR:	
Mechanical Drafting	144-150
Heating and Cooling Technicians	126-132
Sheet Metal Technicians	127-132

EVALUATION:

Given no more than 10 problems by your instructor, you will apply the basic principles of right triangles to solve the unknown value with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 12: Applied Trigonometry

COMPETENCY STATEMENT 02: Use The Pythagorean Theorem To Find The Sides Of A Right Triangle

LEARNING ACTIVITIES:

1. Attend a lecture by your instructor on the principles of right triangles. You will review these formulas:

   $c^2 = a^2 = b^2$

   $a^2 = c^2 - b^2$

   $b^2 = c^2 - a^2$

2. Complete the problems on pages 101-102 in PRACTICAL PROBLEMS IN MATHEMATICS FOR ELECTRICIANS. Check your work with your instructor.

3. Complete the problems on pages 181-184 in PRACTICAL PROBLEMS IN FOR MACHINISTS. Check your work with your instructor. If it is 100% correct, you may skip the Evaluation and go on to the next competency statement.

EVALUATION:

Given no more than 10 problems by your instructor, you will use the Pythagorean Theory to find the sides of a right triangle with 100% accuracy.

STUDENT COMPETENCY SHEET

MODULE 12: Applied Trigonometry

COMPETENCY STATEMENT 03: Use Sine and Cosine Laws To Solve For Unknown Values In Oblique Triangles

LEARNING ACTIVITIES:

1. Study Unit 81 in BASIC MATHEMATICS SIMPLIFIED; If you need any help, ask your instructor.

2. Review the Sine and Cosine Laws with your instructor.

3. Work the problems on page 151 in PRACTICAL PROBLEMS IN MATHEMATICS FOR MECHANICAL DRAFTING. Check your work with your instructor is 100% correct, you skip the Evaluation and go on to the next competency statement.

EVALUATION:

Given no more than 10 problems by your instructor, you will use the Sine and Cosine Laws to solve unknown values in oblique triangles with 100% accuracy.

INSTRUCTOR'S GUIDE
MODULE 13
PANEL DISCUSSION

This is an optional activity that can be scheduled at the instructor's discretion. It is recommended this session be scheduled sometime after the first four modules have been completed so that the students will have a broader knowledge of the areas to be discussed.

Invite several sponsors and/or union officials to come to the class for an informal discussion on apprenticeship programs.

Students should be prepared with questions, in order to make the most efficient use of the time.